

REMARKS

This is a response to the Office action mailed on May 18, 2010. Claims 1-4 and 6-14 are presented for examination. Claim 1 has been amended by the present amendment to more clearly define the subject matter. Support for this amendment can be found, for example, at page 12, lines 19-24 of the International publication. Claim 5 was previously cancelled without prejudice. No new matter has been added by these amendments.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-3, 6, 8, 11, 13 and 14 were rejected under 35 U.S.C. § 103(a) as obvious over Pluijms (4,793,843) in view of French (4,154,591). Claims 4, 7, 9, 10, and 12 were rejected as obvious over Pluijms and French in further view of Keim (5,160,520). Claims 1-3, 6, 8, 11, 13 and 14 were rejected as obvious over Schneider (4,557,561) in view of Wisk (6,220,060). Claims 4, 7, 9, 10, and 12 were rejected as obvious over Schneider and Wisk in further view of Keim and French. Applicants respectfully disagree.

A finding of obviousness requires that “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). In *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 82 USPQ2d 1385 (2007), the Supreme Court stated that the following factors set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) control an obviousness inquiry: (1) the scope and content of the prior art; (2) the differences between the prior art and the claimed invention; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *KSR*, 127 S.Ct. at 1734, 82 USPQ2d at 1388 quoting *Graham*, 383 U.S. at 17-18, 14 USPQ at 467.

Applicant respectfully submits that the pending claims are not obvious over the cited art for the following reasons.

In general, the cited prior art fails to disclose, teach, or suggest at least the following limitations of claim 1:

an etching-and-collapsing process for etching and collapsing the quartz tube at the same time by injecting an reaction gas for etching into the quartz tube together with heating the tube at a temperature higher than the softening temperature such that the tube has an inner diameter within the

range of 2 to 4 mm *in a region which is useable as an optical fiber preform*, just after the etching-and-collapsing process and just before a following closing process;

wherein the tube is kept within said range of diameters at said time by controlling the collapse rate and the etching rate, wherein the collapse rate is controlled by controlling the surface temperature, inner temperature, and inner pressure of the tube, and the etching rate is controlled by controlling the flow rate ratio of component gases comprising the reaction gas;

(Emphasis added.)

Regarding the limitation that the inner diameter of the tube just after completion of the etching-and-collapsing process and just before initiation of the closing process is in the range of 2-4 mm, the Office action at p. 4 admits that this range is not disclosed by either Pluijms or French, and that Pluijms in fact teaches the inner diameter to be at most 1 mm. However, the Office action then argues, referring to Fig. 1 of French, that the end portions of the tube gripped by the chucks must have a large diameter, which then tapers to a small diameter, suggesting that there is a point somewhere with a diameter falling within the claimed range. Claim 1 has now been amended to recite that the claimed diameter range applies “in a region which is usable as an optical fiber preform,” *i.e.*, not to tapering end portions which are destined to become scrap, rather than part of the useable preform. With this clarification, Applicant submits that claim 1 is clearly patentable over the combination of Pluijms and French. Accordingly, the rejection of claim 1 should be withdrawn. Since claims 2-4 and 6-14 are dependent claims depending from claim 1, the rejections of these claims should also be withdrawn, for at least this reason.

Again, regarding the rejection of claim 1 based on the combination of Schneider and Wisk, the Office action admits that Schneider does not disclose or suggest the 2-4 mm diameter limitation. The Office action then relies on the disclosure in Wisk that bubbles are likely to form if the tube has a diameter of less than 1.5-2.5 mm. However, Wisk does not disclose or suggest an upper end for the range, apart from the nonspecific suggestion that if the opening is “large” ovality increases, resulting in unwanted polarization mode dispersion.

Further, none of the cited references disclose or suggest how the diameter of the tube, just after an etching-and-collapsing process and just before a closing process, is to be maintained in the range of 2-4 mm, as recited in amended claim 1, namely:

wherein the tube is kept within said range of diameters at said time by controlling the collapse rate and the etching rate, wherein the collapse rate is controlled by controlling the surface temperature, inner temperature, and inner pressure of the tube, and the etching rate is controlled by controlling the flow rate ratio of component gases comprising the reaction gas;

Applicant respectfully submits that claim 1 is therefore patentable over the cited references. The rejection of claim 1 should therefore be withdrawn, as should the rejections of claims 2-4 and 6-14, dependent from claim 1.

Additionally, regarding the rejections of claims 4, 7, 9, 10, and 12 over Pluijms and French in further view of Keim, even if the Office action is correct that these references disclose “result-effective” variables in the context of the conventional MCVD process, it would not be obvious to one of skill in the art whether such variables would be “result-effective” within a different process such as the one disclosed and claimed in the present application, *i.e.*, one that comprises a distinct “etching-and-collapsing process for etching and collapsing the quartz tube at the same time,” nor could the optimization of process variables for such a new and different process be accomplished by mere “routine experimentation.” For these additional reasons, the rejections of claims 4, 7, 9, 10, and 12 should be withdrawn.

Conclusion


In view of the above, applicants respectfully submit that the present application is in condition for allowance. A favorable disposition to that effect is respectfully requested.

No fees are believed to be due with this submission, except for the fee for the one-month extension of time requested in the accompanying Petition. Please charge this fee or any fee that may be due or credit any overpayment to Jones Day Deposit Account No. 50-3013.

Should the Examiner have any questions or comments concerning this submission, he is invited to call the undersigned at the phone number listed below.

Date: September 20, 2010

Respectfully submitted,



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